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IMPLEMENTATION PLAN REVIEW FOR CONNECTICUT AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

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IMPLEMENTATION PLAN REVIEW

FOR

CONNECTICUT

AS REQUIRED

BY

THE ENERGY SUPPLY

AND

ENVIRONMENTAL COORDINATION ACT

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16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interferring with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

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IMPLEMENTATION PLAN REVIEW

FOR

CONNECTICUT

AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

PREPARED BY THE FOLLOWING TASK FORCE:

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April 1975

CONNECTICUT

ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT
(SECTION IV - STATE IMPLEMENTATION PLAN REVIEW)

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1.0 EXECUTIVE SUMMARY

The enclosed report is the U.S. Environmental Protection Agency's (EPA) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the State on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel burning stationary sources within three months after they are submitted to EPA by the States. The States may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require States to change any existing plan.

Congress has intended that this report provide the State with information on excessively restrictive control regulations. The intent of ESECA is that SIP's, wherever possible, be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regards to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, to encourage States to either defer compliance regulations or to revise the SO_2 emission regulations. The States have also been asked to discourage large scale shifts from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuels policy has addressed only those States with the largest clean fuels saving potential. Several of these States have or are currently in the process of revising SO_2 regulations. These States are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 States and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are (1) the use of the example region approach in developing State-wide air quality control strategies; (2) the existence of State Air Quality Standards which are more stringent than NAAQS; and (3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affect many State plans and in some instances conflict with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIP's conducted in 1972. At that time SIP's were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a State to identify the most polluted air quality control region (AQCR) and adopt control regulations which would be adequate to attain the NAAQS in that region. In using an example region, it was assumed that NAAQS would be attained in the other AQCR's of the State if the control regulations were applied to similar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the State where sources would not otherwise contribute to NAAQS violations. For instance, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned state-wide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of States will use the review findings to assist them in making the decision whether or not to revise portions of their State Implementation Plans. However, it is most important for those States which desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended nor adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there have been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the reports' findings are based are the most currently available to the Federal Government. However, EPA believes that the States possess the best information for developing revised plans. The States have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of air quality. Therefore, those States desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that States select control strategies which place emissions for fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emissions regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution situations such as sulfates.

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is because stationary fuel combustion sources constitute the greatest source of SO_2 emission and are a major source of TSP emissions.

Part of each State's review was organized to provide an analysis of the SO_2 and TSP emission tolerance within each of the various AQCR's. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-cleaning" accomplished by a SIP. The tolerance assessments have been combined in Section 2 and Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for changing emission limitation regulations. In conjunction with the regional analysis, a summary of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendices C, D, and E.

The State Implementation Plan for the State of Connecticut has been reviewed for the most prevalent causes of over-restrictive emissions limiting regulations. The major findings of the review are as follows:

FOR SO_2, THE REVIEW INDICATES THAT SOME POTENTIAL EXISTS FOR REVISING CURRENT FUEL SULFUR CONTENT REGULATIONS IN THE EASTERN CONNECTICUT AND NORTHWESTERN CONNECTICUT INTRASTATE AQCR'S.

FOR PARTICULATES, THE REVIEW INDICATES THAT SOME POTENTIAL EXISTS FOR REVISING EMISSION LIMITING REGULATIONS IN THE NORTHWESTERN CONNECTICUT AQCR.

The supportive findings of the SIP review are as follows:

Connecticut - The State of Connecticut has no air quality standard which is more stringent than any National Ambient Air Quality Standard and has not utilized the "example region" approach in developing its SIP.

Eastern Connecticut Intrastate AQCR - Air quality violations, no tolerance for an emission increase and modeling results for one major power plant indicate that little potential exists for revising particulate emission limiting regulations at the present time. Some potential exists for revising sulfur content regulations based on air quality although modeling results for the major power plant were negative for the conversion modeled. Further research of the circumstances would be needed.

Hartford - New Haven - Springfield Interstate AQCR - Air quality violations, no tolerance for emission increase proposed Air Quality

Maintenance Areas and power plant modeling results indicate that little potential exists for revising either particulate or sulfur dioxide emission limiting regulations in this AQCR.

New Jersey - New York - Connecticut Interstate AQCR - Air quality violations, no tolerance for emission increase, proposed Air Quality Maintenance Areas and power plant modeling results indicate that little potential exists for revising either particulate or sulfur dioxide emission limiting regulations in this AQCR. In addition, the region is densely populated.

Northwest Connecticut Interstate AQCR - Air quality data indicate that some potential exists for revising both particulate and sulfur dioxide emission limiting regulations though no modeling was available. Clean fuel savings may be limited, however, since major point sources are few. Some clean fuel savings may result from revision of area source emission regulations but these will probably not be significant.

2.0 STATE IMPLEMENTATION PLAN REVIEW

2.1 SUMMARY

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the State have air quality standards which are more stringent than NAAQS?
- Does the State have emission limitation regulations for control of (1) power plants, (2) industrial sources, (3) area sources?
- Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?
- Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on (1973) air quality data, are there no reported violations of NAAQS?
- Based on (1973) air quality data, are there indications of a tolerance for increasing emissions?
- Are the total emissions from stationary fuel combustion sources proportionally lower than those of other sources?
- Is there a significant clean fuels savings potential in the region?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?

The following portion of this report is directed at answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

The initial part of the SIP review report, Section 2 and Appendix A, was organized to provide the background and current situation information for the State Implementation Plan. Section 3 and the remaining Appendices

provide an AQCR analysis which helps establish the overall potential for revising regulations. Emission tolerance estimates have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for revising emission limiting regulations. In conjunction with the regional analysis, a characterization of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendices C, D, E.

Based on an overall evaluation of EPA's current information, AQCR's have been classified as good, marginal, or poor candidates for regulation revisions. Table 2-1 summarizes the State Implementation Plan Review. The remaining portion of the report supports this summary with explanations.

The main factor in determining the candidacy for regulation revision is the air quality status. Any AQCR which has an air quality violation is automatically given a poor rating. On the other hand, a region with no air quality violations, no AQMA designations, low to moderate emissions, along with a small percentage of emissions from fuel combustion sources, would receive a good rating. Those AQCR's that have varying indicators would need further evaluation and would be given a marginal rating.

2.2 CURRENT AIR QUALITY STATUS OF CONNECTICUT

2.2.1 Definition Of Air Quality Control Regions

The State of Connecticut is comprised of four Air Quality Control Regions (AQCR's), two intrastate and two interstate. These are listed below:

- Eastern Connecticut Intrastate - AQCR 41
- Hartford - New Haven - Springfield Interstate (Mass) - AQCR 42
- New Jersey - New York - Connecticut Interstate - AQCR 43
- Northwestern Connecticut Intrastate - AQCR 44

Figure 2-1 illustrates the geographic boundaries of the Connecticut portions of these AQCR's.

TABLE 2-1

STATE IMPLEMENTATION PLAN REVIEW
(SUMMARY)

"Indicators"	Connecticut TSP	Connecticut SO_2	AQCR 41 Eastern Conn. TSP	AQCR 41 Eastern Conn. SO_2	AQCR 42 Hartford New Haven Springfield TSP	AQCR 42 Hartford New Haven Springfield SO_2	AQCR 43 N.J.-N.Y.-Conn. TSP	AQCR 43 N.J.-N.Y.-Conn. SO_2	AQCR 44 Northwestern Connecticut TSP	AQCR 44 Northwestern Connecticut SO_2
• Does the State have air quality standards which are more stringent than NAAQS?	No	No								
• Does the State have emission limiting regulations for control of:										
1. Power plants	Yes	Yes								
2. Industrial sources	Yes	Yes								
3. Area sources	Yes	Yes								
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	No	No								
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?	Yes	Yes								
• Are there no proposed Air Quality Maintenance Areas?			Yes	Yes	No	No	No	No	Yes	Yes
• Are there indications of a sufficient number of monitoring sites within a region?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Is there an expected 1975 attainment data for NAAQS?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Based on (1973) Air Quality Data, are there no reported violations of NAAQS?			No	Yes	No	No	No	No	Yes	Yes
• Based on (1973) Air Quality Data, are there indications of a tolerance for increasing emissions?			No	Yes	No	No	No	No	Yes	Yes
• Are the total emissions from stationary fuel combustion sources proportionally lower than those of other sources?			No	No	No	No	No	No	No	No
• Do modeling results for fuel combustion sources show a potential for a regulation revision?			No	No	No	No	No	No	N.A.	N.A.
• Must emission limiting regulations be revised to accommodate significant fuel switching?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			Poor	Marg.	Poor	Poor	Poor	Poor	Marg.	Marg.
• Is there a significant Clean Fuels Saving potential in the region?			No		No		No		No	

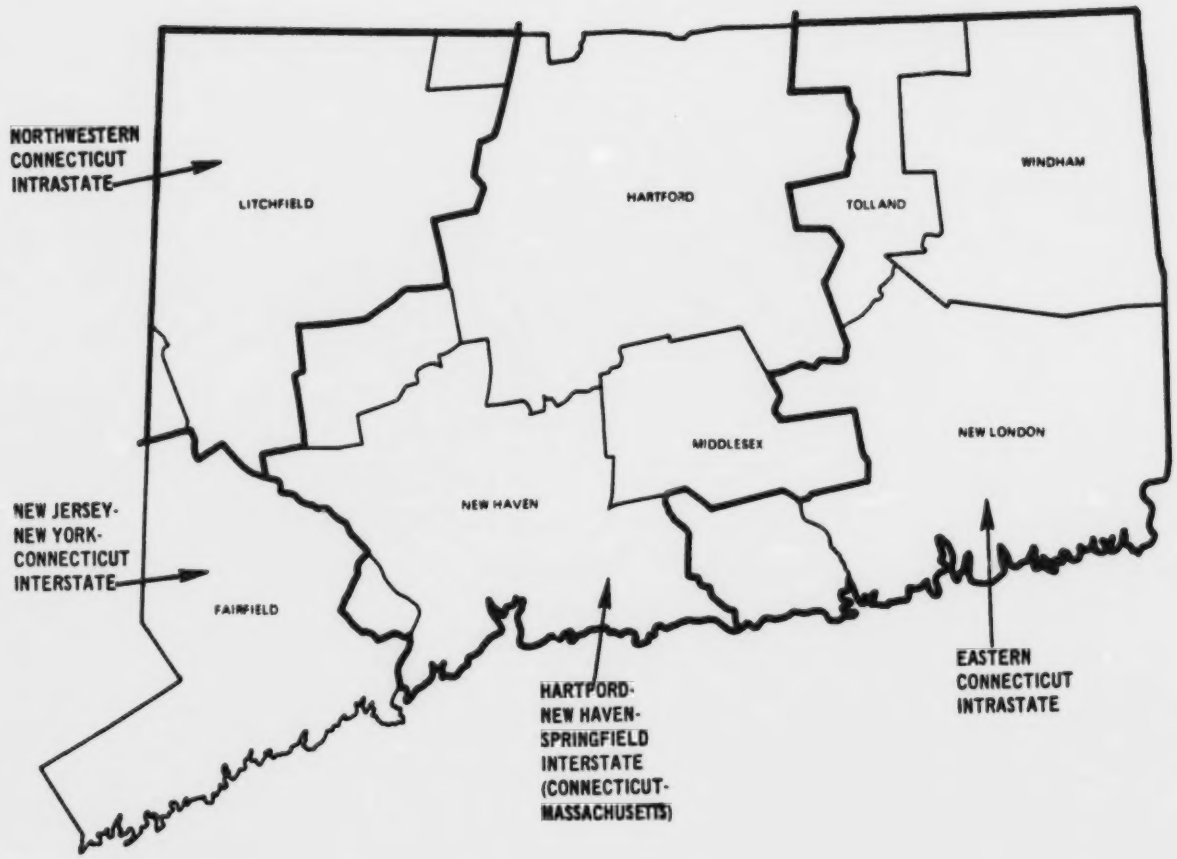

Figure 2-1 Air Quality Control Regions in Connecticut

2.2.2 Air Quality Standards

A summary of the Federal and Connecticut air quality standards for particulates and SO_2 is presented in Table A-2. It should be noted that the standards adopted by Connecticut are identical to the Federal standards for both pollutants.

2.2.3 Air Quality Monitoring

Connecticut air quality data for total suspended particulates (TSP) and sulfur dioxide (SO_2) are given in Tables A-4 and A-5 respectively.

Air quality monitoring in the Eastern Connecticut AQCR consists of six stations for TSP and eight stations for SO_2 (eight 24 hr. bubbler, no continuous stations). Monitoring data for 1973 indicated a violation of federal TSP standards but no violations of SO_2 standards.

In the Hartford-New Haven-Springfield Interstate AQCR, air quality monitoring consists of 67 stations for TSP and 34 stations for SO_2 (25 24-hr. bubbler, 9 continuous stations). Thirty-four of the TSP monitors, 17 of the 24-hour SO_2 monitors and 8 continuous SO_2 monitors are located in Connecticut. The monitoring data indicated violations of the federal standards for both TSP and SO_2. The region has also been proposed as an Air Quality Maintenance Area (AQMA) for both pollutants.

In the New Jersey-New York-Connecticut Interstate AQCR, air quality monitoring consists of 166 stations for TSP and 118 stations for SO_2 (47 24-hr. bubbler, 71 continuous stations). Seventeen of the TSP monitors, 17 of the 24-hour SO_2 monitors and 16 of the continuous SO_2 monitors are located in Connecticut. Violations of the federal standards for both TSP and SO_2 were reported and the region has been proposed as an AQMA for both pollutants.

In the Northwestern Connecticut AQCR there were no violations of TSP or SO_2 standards reported by the four TSP stations and the three SO_2 stations (all 24-hr. bubbler, no continuous) in 1973.

2.2.4 Emissions of Sulfur Dioxide and Particulates

The contributions of fuel combustion sources located in Connecticut to the total emissions in each AQCR are summarized in Table A-6 for both TSP and SO_2. Tables A-7 and A-8 provide a more detailed view by means of categorization in terms of combustion source type, i.e., electricity generation, industrial-commercial-institutional, and area. In general, fuel combustion sources account for a majority of the particulate (56%) and SO_2 emissions (86%) in the State of Connecticut.

2.3 GENERAL REVIEW OF THE CURRENT STATE IMPLEMENTATION PLAN

The Connecticut State Implementation Plan contained control strategies and regulations for both particulate and sulfur dioxide which will be adequate enough to attain State air quality standards which are the same as the Federal Standards. The State did not utilize the example region approach in formulating its SIP.

The state regulations for the control of particulate matter include a requirement that existing fuel burning sources cannot emit particulate matter in excess of 0.20 pounds per million BTU of heat input and 0.10 pounds per million BTU of heat input for new sources (Table A-9). The state also has a visible emission regulation which says that no person shall exceed No. 1 on the Ringleman Chart or 20 percent opacity except for periods aggregating not more than 5 minutes in any 60 minutes provided they still do not exceed No. 2 on the Ringleman Chart or 40 percent opacity. Other regulations covering particulate emission are fugitive dust, incineration, process industries - general, and process industries - specific (iron cupolas, asphalt plants, foundries, and concrete batching).

The State regulations for the control of sulfur compound emissions include the requirement that after April 1, 1973 no person shall burn fuel which contains sulfur in excess of 0.5% by weight. Other regulations include controlling sulfur compounds from sulfuric acid plants, sulfur recovery plants, non-ferrous smelter sulfite pulp mills, and other process sources.

3.0 AIR QUALITY CONTROL REGION ASSESSMENTS

The purpose of this section is to evaluate the available information for the State of Connecticut and determine the feasibility of revisions to the SIP which would result in clean fuel conservation. The first subsection provides explanations of the methods used in making the regional assessments. Subsections 3.2 through 3.5 present the results of the application of the criteria for each of the Connecticut AQCR's.

3.1 THE ASSESSMENT CRITERIA

In determining the potential of the AQCR's in a state for emission standard relaxation, a set of five evaluation criteria has been established:

- The Regional Indicators,
- Power Plant Evaluation,
- Other Major Fuel Burning Point Source Evaluation,
- Area Source Evaluation,
- Fuel Use Assessment.

The following paragraphs provide explanations of the use of these criteria.

3.1.1 The Regional Evaluation

This assessment is based on a review of regional air quality data, various regional or subregional categorizations (e.g., priority classifications or proposed air quality maintenance area (AQMA) designations), and other information available to EPA. The assessment must be made for each pollutant separately and is made on the basis of 7 indicators: (1) recent air quality violations; (2) expected NAAQS attainment dates; (3) proposed Air Quality Maintenance Area (AQMA) designations; (4) total emissions; (5) portion of emissions from fuel combustion sources in Connecticut; (6) regional tolerance for emission increase; and (7) SO_2 priority classification. Tables B-1 and B-2 tabulate these criteria for each AQCR for TSP and SO_2, respectively. This preliminary analysis will be supplemented by a more detailed evaluation after the individual source categories are reviewed.

3.1.2 Power Plant Evaluation

The evaluation of power plants was based on the modeling analyses performed by Walden Research[1,2] and EPA[3]. Both assumed certain oil-to-coal conversions for some of the power plants in Connecticut and then performed plant-by-plant diffusion modeling to determine the air quality impacts of the plants, before and after conversion. The power plant data appear in Appendix C: Table C-1 summarizes pertinent data by plant, including fuel use and emissions; Table C-2 summarizes these data for each AQCR; and Table C-3 lists the projected 1975 capacity and fuel use for the major plants in each AQCR.

3.1.3 Major Industrial and Commercial Point Source Evaluation

No modeling results were available for the larger industrial, commercial, or institutional point sources in Connecticut. Consequently, the analysis was restricted to an estimate of the emissions reduction resulting from the compliance of these sources with current Connecticut emission and fuel regulations. The results appear in Appendix D.

3.1.4 Area Source Evaluation

Area source emissions data were available by AQCR[4] and by county from the National Emissions Data System (NEDS). These data were used to determine the emissions from Connecticut fuel combustion area sources which are given in Appendix E. Table E-1 indicates the types of fuel burned by fuel combustion area sources, sulfur contents and emissions by AQCR.

3.1.5 Fuels Analysis

Fuel usage data for the State of Connecticut are tabulated in Appendix F. These data provide a survey of the distribution of fuels by user type for the entire state, as well as by AQCR. The data is fundamentally important to potential clean fuel savings which will be significant in a region which can tolerate a regulation revision only if a significant amount of fuel is burned in the region. The data has its shortcomings however, because the data for the Interstate AQCR's are for the entire AQCR rather than the Connecticut portion of the AQCR.

3.2 EASTERN CONNECTICUT INTRASTATE AQCR 41

3.2.1 Regional Assessment (Appendix B)

The regional evaluation of the Eastern Connecticut AQCR indicates that little potential exists for increasing particulate emissions but some potential exists for increasing SO_2 emissions. The indicators are summarized below:

- Particulates - one reported air quality violation and no tolerance for emission increase.
- Sulfur Dioxide - no air quality violations, no proposed AQMA designations and a positive tolerance for emission increase.

Tables B-1 and B-2 list the indicators by AQCR for TSP and SO_2, respectively.

3.2.2 Power Plant Assessment (Appendix C)

NEDS data indicate the existence of six power plants in the Eastern Connecticut AQCR. Together, they account for approximately 22 percent and 61 percent of the particulate and sulfur dioxide emissions within the AQCR, respectively. Three of the six plants; those at Preston, Killingly, and Putnam, are gas turbine plants burning distillate oil, and contributing almost negligible amounts of particulates and SO_2. Of the three steam turbine generating plants, two are very small and also contribute negligible amounts of pollution. These two are the plant at New London burning liquid petroleum gas (LPG) and the plant at Waterford burning a small quantity of residual oil The only major plant in the region is the 600 megawatt plant at Montville which burns significant amounts of both coal and residual oil, and small amounts of distillate and diesel oil; the diesel in a reciprocating diesel engine. All six plants are operated by Connecticut Light and Power.

A fuel conversion was modeled by Walden Research for the Montville plant. According to the analysis, units 1, 2 and 5 of the plant's six

units are convertible to coal. These units are rated at 34.5, 34.5 and 82 MW, respectively. The modeling results indicated that currently the plant, burning .9% sulfur oil, contributes about 128 $\mu g/m^3$ to the 24-hour SO_2 concentrations and about 7 $\mu g/m^3$ to the 24-hour TSP concentrations. The analysis was based on 1972 data and is limited to 24-hour concentrations because a special diffusion model suited to the valley topography was utilized. If units 1, 2 and 5 were converted to 3.0% sulfur, 15% ash coal, and operating at 80% control efficiency, the modeling results indicated that the plant would contribute about 460 $\mu g/m^3$ to the 24-hour SO_2 concentrations and about 191 $\mu g/m^3$ to the 24-hour TSP concentrations, violating the federal primary SO_2 standard and secondary TSP standard. The results of the modeling are given below in Table 3-1:

TABLE 3-1

MONTVILLE PLANT MODELING RESULTS

Plant/Conversion	Maximum 24 Hour Concentration ($\mu g/m^3$)				Maximum Annual Concentrations ($\mu g/m^3$)	
	SO_2		Particulates			
	Nominal[a] Load	Maximum[b] Load	Nominal Load	Maximum Load	SO_2	Particulates
Montville (a)						
1972 Operations	128	144	7	8	---	---
Switch Units (1,2,5)	460	533	191	224	---	---

[a] Nominal Load Case - This presents maximum concentrations calculated by the model based upon *average monthly* emission rates.

[b] Maximum Load Case - This case was calculated assuming the plant to be operating at 95% of rated capacity. Concentrations were predicted for the 20 highest concentration days under nominal load. A 10% safety factor was subsequently added to these predicted concentrations because the maximum load case involves a greater plume rise, and a somewhat higher concentration may therefore occur on a different day and at a different receptor.

In addition, on the basis of other preliminary modeling, EPA did not advise conversion of the Montville plant to coal firing for the following reasons:

> The river valley topography, in which the plant is situated, severely limits effective dispersion of emissions from the Montville stacks. Consequently, there is a strong likelihood of a significant impact from increased emissions in the cities of Norwich and New London, Connecticut. Though presently below the primary standards, air quality in these areas is not sufficiently good to be able to absorb a substantial increase in emissions without a sizeable risk of violating the primary standards. Furthermore, the age and original design efficiency of existing particulate control equipment does not warrant belief that a reasonable degree of particulate collection can be obtained while operating on coal. Lastly, since it is deemed impossible to retrofit flue gas desulfurization equipment at the Montville plant, it is unlikely that the plant could ever be brought into compliance with Connecticut emission regulations.

In summary, the Montville plant is not recommended for conversion to coal, at least not the conversion modeled.

3.2.3 Major Industrial and Commercial Point Source Assessment (Appendix D)

Since no modeling was available for industrial and commercial point sources, the analysis was limited to a comparison of the current emissions and the allowable emissions for these sources.

As indicated in Tables A-7 and A-8, industrial and commercial point sources contribute approximately 7 percent to the particulate emissions and 14 percent to the SO_2 emissions from fuel combustion sources in the Eastern Connecticut Intrastate AQCR. Table D-1 lists one significant industrial/commercial point source in the AQCR for particulates; Table D-2 lists 5 significant sources for SO_2. These significant sources account for about 6 percent and 14 percent of the AQCR fuel combustion particulate and SO_2 emissions, respectively. Table D-3 summarizes the current emissions and potential emission reductions for the AQCR indicating that existing regulations might allow an increase in particulate emissions from industrial and commercial sources. However, air quality data for the AQCR indicates that this would not be possible.

3.2.4 Area Source Assessment (Appendix E)

Area fuel combustion sources contribute significantly to the particulate and sulfur dioxide emissions in the Eastern Connecticut Intrastate AQCR. Tables A-6 and A-7 indicate that they represent the source of about 30 percent and 23 percent of the particulate and sulfur dioxide emissions, respectively. Table E-1 shows area fuel combustion sources burn coal, oil, natural gas and wood with oil burning accounting for the majority of emissions. It is unlikely, however, that these sources could convert from oil or gas to coal in light of the AQCR particulate problem and the inherent inflexibility of these sources to convert. Some clean fuel savings may result from increasing sulfur contents but it is unlikely to be a significant amount.

3.3 HARTFORD-NEW HAVEN-SPRINGFIELD INTERSTATE AQCR 42

3.3.1 Regional Assessment (Appendix B)

The regional evaluation of the Hartford-New Haven-Springfield AQCR indicated that little potential exists for increasing either particulate or SO_2 emissions. The supportive indicators are as follows:

- Particulates - reported air quality violations, proposed AQMA designations and no tolerance for emission increase.
- Sulfur Dioxide - reported air quality violations, proposed AQMA designations and no tolerance for emission increase.

Tables B-1 and B-2 list these indicators by AQCR for TSP and SO_2, respectively.

3.3.2 Power Plant Assessment (Appendix C)

Ten power plants are listed in the NEDS data for the Connecticut portion of the Hartford-New Haven-Springfield Interstate AQCR. Connecticut Power and Light operates a very small LPG fired plant at Berlin, two small distillate oil fired gas turbine plants at Enfield and Branford, a small residual oil and natural gas fired plant at Waterbury, and a plant at Thompsonville which has one distillate oil and natural gas boiler, and one gas turbine also using distillate oil and natural gas. The emissions of both particulates and SO_2 are less than 100 tons per year for each of these five plants.

The remaining five plants in the region each emit more than 100 tons per year of SO_2. They are: Hartford Electric's 220 megawatt South Meadow plant and 420 megawatt Middletown plant, both of which have residual oil fired boilers and distillate oil fired gas turbines; United Illuminating Company's 20 megawatt Derby plant and 160 megawatt English plant, both using residual oil fired boilers; and Connecticut Light and Power's Devon plant which burns coal, residual and distillate oil as boiler fuel, and distillate oil in a gas turbine.

Collectively, the ten power plants contribute approximately 6 percent and 34 percent to the particulate and sulfur dioxide emissions in the Connecticut portion of the AQCR, respectively.

Preliminary modeling of a fuel conversion was done by EPA for the Hartford Electric Company's Middletown plant. The plant consists of three units, two of which are convertible to coal. Concentrations estimated by the modeling indicated that changing units 1 and 2 from .5% sulfur oil to a maximum of 2.5% sulfur coal and keeping unit 3 on a .5% sulfur oil would result in contributions to 24-hour SO_2 concentrations of 160 $\mu g/m^3$, an increase of about 130 $\mu g/m^3$ over the oil case. Particulate concentrations would be about 40 $\mu g/m^3$ with 15% ash and 90% control. Actual concentrations may be higher due to the effects of the river valley topography in which the plant is located. These terrain effects are not taken into account in the model. No conclusions can be drawn from this modeling because of the terrain effects and the lack of air quality data in areas immediately around the plant. Any conversion would require increased monitoring and high levels of control.

3.3.3 Major Industrial and Commercial Point Source Assessment (Appendix D)

As previously mentioned, no modeling data were available for industrial and commercial point sources, therefore the analysis was limited to a comparison of the current emissions and the allowable emissions for these sources. As indicated in Tables A-7 and A-8, industrial and commercial point sources contribute approximately 12 percent to the particulate emissions and 27 percent to the SO_2 emissions in the Hartford-New

Haven-Springfield Interstate AQCR. Table D-1 lists one significant industrial/commercial point source in the AQCR for particulates; Table D-2 lists 26 significant sources for SO_2. These significant sources account for about 1 percent and 8 percent of the AQCR fuel combustion particulate and SO_2 emissions, respectively. Table D-3 summarizes current emissions and potential emission reductions, indicating that existing regulations might allow a slight increase in particulate emissions from industrial and commercial sources. However, air quality data for the AQCR indicate that this would not be feasible.

3.3.4 Area Source Assessment (Appendix E)

Area fuel combustion sources in the Hartford-New Haven-Springfield AQCR account for approximately 41 percent of the particulate emissions and 36 percent of the sulfur dioxide emissions. Table E-1 shows fuel use for area sources in the AQCR and indicates that oil is the major fuel used. It is unlikely that these sources could convert from oil to coal because of the inherent lack of flexibility of the sources themselves and the AQCR particulate problem. It is unlikely that higher sulfur oil could be used because of the SO_2 problem.

3.4 NEW JERSEY-NEW YORK-CONNECTICUT INTERSTATE AQCR 43

3.4.1 Regional Assessment (Appendix B)

The regional evaluation of the New Jersey-New York-Connecticut AQCR indicates little potential for increasing particulate or sulfur dioxide emissions based on 1973 air quality data. The indicators are summarized below:

- Particulates - reported air quality violations, proposed AQMA designations and no tolerance for an emission increase.
- Sulfur Dioxide - reported air quality violations, proposed AQMA designations and no tolerance for an emission increase.

Tables B-1 and B-2 list these indicators by AQCR for TSP and SO_2, respectively.

3.4.2 Power Plant Assessment (Appendix C)

Of the four power plants in the Connecticut portion of the New Jersey-New York-Connecticut AQCR, three emit a significant amount of SO_2. Two of these, the 170 megawatt Steel Point plant and the 650 megawatt Bridgeport Harbor plant burn residual oil and are operated by United Illuminating Co. The third, Connecticut Light and Power's Norwalk Harbor plant has a capacity of 325 megawatts and burns coal, residual and distillate oil in boilers, plus a small quantity of deisel fuel in a reciprocating engine generator. The fourth plant is a small distillate oil fired gas turbine plant operated by Connecticut Light and Power at Greenwich.

Jointly, the four plants contribute approximately 43 percent to the particulate emissions and 68 percent to the sulfur dioxide emissions in the AQCR.

A fuel conversion was modeled by Walden Research for Connecticut Light and Power Norwalk Harbor plant. The results (shown in Table 3-2) indicated that presently the plant, burning .8% sulfur oil, contribures about 23 $\mu g/m^3$ to local 24-hour SO_2 concentrations and about 1 $\mu g/m^3$ to local 24-hour TSP concentrations.

Converting Units 1 and 2 to 2.5% sulfur, 15% ash coal, and operating at 95% control efficiency yielded local 24-hour concentrations of 96 $\mu g/m^3$ and 13 $\mu g/m^3$ for SO_2 and TSP, respectively.

TABLE 3-2
NORWALK HARBOR PLANT MODELING RESULTS

Plant/Conversion	Maximum 24-Hour Concentration ($\mu g/m^3$)				Maximum Annual Concentrations ($\mu g/m^3$)	
	SO_2		Particulates			
	Nominal Load	Maximum Load	Nominal Load	Maximum Load	SO_2	Particulates
Norwalk Harbor						
1972 Operations	23	28	1	2	<1	<1
Switch Unit 1, 2	96	115	13	15	4	<1

Preliminary modeling performed by EPA indicated similar results. Using .5% sulfur oil the plant contributed about 15 $\mu g/m^3$ to local 24-hour SO_2 concentrations and 2 $\mu g/m^3$ to local 24-hour TSP concentrations. Converting the two units to 2.5% sulfur, 15% ash coal and operating at 95% control efficiency would result in local 24-hour concentrations of approximately 110 $\mu g/m^3$ of SO_2 and 15 $\mu g/m^3$ of TSP.

Other factors were considered by the Connecticut Department of Environmental Protection which estimated on an annual basis, combustion of 2.5% sulfur coal in units 1 and 2 would result in an incremental impact of SO_2 of 17 $\mu g/m^3$.

Existing annual SO_2 averages in nearby areas range from 50 to 70 $\mu g/m^3$. The incremental inpact in particulates of burning 15% ash coal would be approximately 8 $\mu g/m^3$. Annual background TSP concentration in the area of maximum impact is 80 $\mu g/m^3$. By these modeling results, the annual primary standards for TSP and SO_2 would probably be violated by conversion of the Norwalk Harbor plant to coal. Furthermore, the plant is located in a densely populated region of Connecticut and conversion to coal would exacerbate an existing TSP problem.

3.4.3 Major Industrial and Commercial Point Source Assessment (Appendix D)

Since no modeling data were available for industrial and commercial point sources, the analysis was limited to a comparison of the current emissions and the allowable emissions for these sources. As indicated in Tables A-7 and A-8, industrial and commercial point sources contribute approximately 2 percent to the particulate emissions and 3 percent to the SO_2 emissions in the New Jersey-New York-Connecticut Interstate AQCR. Table D-1 lists no significant industrial/commercial point source in the AQCR for particulates; Table D-2 lists 5 significant sources for SO_2. These significant sources account for about 2 percent of the AQCR fuel combustion SO_2 emissions. Table D-3 summarizes current emissions and potential emission reductions indicating that existing regulations do not allow any increase in either particulate or SO_2 emissions.

3.4.4 Area Source Assessment (Appendix E)

Area fuel combustion sources contribute approximately 38 percent and 26 percent to the particulate and sulfur dioxide emissions in the New Jersey-New York-Connecticut AQCR, respectively (Tables A-6 and A-7). Table E-1 shows fuel use for area sources in the AQCR. Conversions are unlikely because of the TSP and SO_2 problems, and the inflexible nature of the sources involved.

3.5 NORTHWESTERN CONNECTICUT INTRASTATE AQCR 44

3.5.1 Regional Assessment (Appendix B)

The regional evaluation for the Northwestern Connecticut AQCR indicates that some potential exists for increasing particulate and sulfur dioxide emissions. The indicators are summarized below:

- Particulates - no reported air quality violations, no proposed AQMA designations and a tolerance for an emission increase.
- Sulfur Dioxide - no reported air quality violations, no proposed AQMA designations and a tolerance for an emission increase.

Tables B-1 and B-2 list these indicators by AQCR for TSP and SO_2, respectively.

3.5.2 Power Plant Assessment (Appendix C)

The only power plants in the Northwestern Connecticut AQCR are two distillate oil gas turbines operated by Hartford Electric Co. at Torrington. These plants both emit less than 20 tons per year each of particulates and SO_2, and therefore are relatively insignificant sources. Together, they account for approximately 3 percent of the particulate emissions and 1 percent of the SO_2 emissions from fuel combustion sources.

3.5.3 Major Industrial and Commercial Point Source Assessment (Appendix D)

As previously mentioned no modeling data were available for Connecticut industrial and commercial point sources, therefore the analysis was limited to a comparison of the current emissions and the allowable

emissions for these sources. As indicated in Table A-7 and A-8, industrial and commercial point sources contribute approximately 6 percent to the particulate emissions and 10 percent to the SO_2 emissions in the Northwestern Connecticut Intrastate AQCR. Table D-1 lists no significant industrial/commercial point sources in the AQCR for particulates; Table D-2 lists 1 significant source for SO_2. This significant source accounts for about 7 percent of the AQCR fuel combustion SO_2 emissions. Table D-3 summarizes the current emissions and potential emission reductions for the AQCR indicating no potential for increasing emissions under the existing regulations.

3.5.4 Area Source Assessment (Appendix E)

Area fuel combustion sources account for 67 percent of the particulate emissions and 84 percent of the sulfur dioxide emissions in the Northwestern Connecticut AQCR. However, total emissions for the AQCR are relatively low and conversion from oil to coal is not very practical for these sources. Some clean fuel savings may result from increasing sulfur contents but it is unlikely to be a significant amount.

4.0 REFERENCES

1. "Modeling Analysis of Power Plants for Fuel Conversion", (Group I), prepared by Walden Research, for Environmental Protection Agency, 15 July 1974.

2. Ibid., (Group IV), 9 September 1974.

3. Preliminary modeling done by the Monitoring and Data Analysis Division of the Office of Air Quality Planning and Standards, EPA, Research Triangle Park, North Carolina.

4. "1972 National Emissions Report," Report No. EPA 450/2-74-012, U.S. Environmental Protection Agency, June 1974.

5. "Steam - Electric Plant Factors/1972," 23rd edition, National Coal Association, 1973.

6. "Compilation of Air Pollutant Emission Factors," Publication No. AP-42, U.S. Environmental Protection Agency, January 1972.

7. "Federal Air Quality Control Regions," Publication No. AP-102, U.S. Environmental Protection Agency, January 1972.

8. SAROAD (Storage and Retrieval of Aerometric Data) computer printouts for 1973.

9. Federal Power Comission (FPC) fuel usage projections for major power plants in Connecticut, status as of 5 July 1974.

10. "Stationary Source Fuel Summary Report," National Emission Data System, Environmental Protection Agency, 23 September 1974.

APPENDIX A

IMPLEMENTATION PLAN BACKGROUND

TABLE A-1

CONNECTICUT AIR POLLUTANT PRIORITY CLASSIFICATIONS

Air Quality Control Region	Program Number	Priority Classification[a] TSP	Priority Classification[a] SO_x	Population 1975 (Millions)	Proposed AQMA Designation[b] TSP	Proposed AQMA Designation[b] SO_x
Eastern Conn.	41	II	III	0.45	None	None
Hartford-New Haven-Springfield (Mass.)	42	I	I	2.54[c]	Total Connecticut Portion for Both Pollutants	
New Jersey-New York-Conn. (N. J., N. Y.)	43	I	I	18.72[c]	Total Connecticut Portion for Both Pollutants	
Northwest Conn.	44	III	III	0.16	None	None

[a]Criteria based on maximum measured (or estimated) pollution concentration in area:

Priority	I	II	III
	Greater than ($\mu g/m^3$)	From - To ($\mu g/m^3$)	Less than ($\mu g/m^3$)
Sulfur dioxide:			
Annual arithmetic mean	100	60-100	60
24-hour maximum	455	260-455	260
Particulate matter:			
Annual geometric mean	95	60-95	60
24-hour maximum	325	150-325	150

[b]Federal Register, July, 1974 counties showing potential for NAAQS violations due to growth.

[c]AQCR Total population. The population in the Conn. portion of AQCR's 42 and 43 were 1.7 ($x10^6$) and .78 ($x10^6$) respectively in 1970.

TABLE A-2

AMBIENT AIR QUALITY STANDARDS

All Concentrations in $\mu g/m^3$

		Total Suspended Particulates		Sulfur Dioxide		
		Annual	24-Hour	Annual	24-Hour	3-Hour
Federal	Primary	75(G)	260[a]	80(A)	365[a]	-
	Secondary	60(G)	150[a]	-	-	1300[a]
State	Primary	75(G)	260[a]	80(A)	365[a]	-
	Secondary	60(G)	150[a]	60(A)[b]	260[a, b]	1300[a]

(G) Geometric Mean

(A) Arithmetic Mean

a Not to be exceeded more than once per year.

b These values were Federal Standards until they were rescinded.

TABLE A-3

AIR QUALITY STANDARDS ATTAINMENT DATES

Air Quality Control Region	Particulates		Sulfur Dioxide	
	Primary	Secondary	Primary	Secondary
Eastern Conn.	a	6/75	b	b
Hartford-New Haven-Springfield	5/75	5/75	6/75	6/75
New Jersey-New York-Conn.	5/75	5/75	6/75	6/75
Northwest Conn.	b	b	b	b

a Air Quality Levels Presently Below Primary Standards

b Air Quality Levels Below Secondary Standards

TABLE A-4

CONNECTICUT AIR QUALITY STATUS (1973), TSP[a]

Air Quality Control Region	# Stations Reporting	TSP Concentration($\mu g/m^3$) Highest Reading Annual	TSP Concentration($\mu g/m^3$) Highest Reading 24-Hr	TSP Concentration($\mu g/m^3$) 2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Standards: Primary Annual	Primary 24-Hr[c]	Secondary Annual	Secondary %	Secondary 24-Hr[c]	Secondary %	% Reduction Required to Meet Standards[d]	Standard on Which % Reduction Is Based
Eastern Conn. (41)	6	-	270	156	-	0	-	-	1	17	+ 5	24-Hr
Hartford-New Haven-Springfield[b] (42)	67	117[e]	443	396	1	1	2	1	12	18	+70	Annual
New Jersey-New York-Conn.[b] (43)	166	125[f]	489[c]	424[g]	5	5	18	11	56	34	+72	Annual
Northwest Conn. (44)	4	-	165	124	-	0	-	-	0	0	-29	24-Hr

[a] 1973 air quality in National Air Data Bank, July 28, 1974.

[b] Interstate.

[c] Violations based on more than one reading in excess of standard.

[d] Formula: $\frac{\text{2nd Highest 24 Hr - 24 Hr Secondary Standard}}{\text{2nd Highest 24-Hr - Background}} \times 100$, $\frac{\text{Annual - Annual Secondary Standard}}{\text{Annual - Background}} \times 100$

[e] Reading recorded in Massachusetts portion of AQCR.

[f] Reading recorded in New Jersey portion of AQCR.

[g] Reading recorded in New York portion of AQCR.

Background Values: Eastern Connecticut and Northwestern Connecticut AQCRs: $30 \mu g/m^3$
Hartford-New Haven-Springfield: $36 \mu g/m^3$
New Jersey-New York-Connecticut $35 \mu g/m^3$

TABLE A-5

CONNECTICUT AIR QUALITY STATUS (1973), SO_2[a]

Air Quality Control Region	# Stations Reporting 24-Hr (Bubbler)	# Stations Reporting (Contin.)	SO_2 Concentration ($\mu g/m^3$) Highest Reading Annual	Highest Reading 24-Hr	2nd Highest Reading 24-Hr	Primary Annual	Primary 24-Hr[c]	Secondary 3-Hr	% Reduction[d] Required To Meet Standards	Standard on Which % Reduction Is Based
Eastern Conn. (41)	8	0	8	45	30	0	0	-	-900	Annual
Hartford-New Haven-Springfield[b] (45)	25	9	32[e]	992	-[f]	0	4[i]	-	+ 63[f]	24-Hour
New Jersey-New York-Conn.[b] (43)	47	71	86[g]	1381	93[h]	1	10	2	+ 7	Annual
Northwest Conn. (44)	3	0	-	37	30	0	0	0	-1166	24-Hour

[a] 1973 air quality data in National Air Data Bank, July 28, 1974.

[b] Interstate.

[c] Violation based on 2nd highest reading at any station.

[d] Formula:

$$\frac{\text{2nd Highest 24-Hr} - \text{24-Hr Standard}}{\text{2nd Highest 24-Hr}} \times 100, \quad \frac{\text{Annual} - \text{Annual Standard}}{\text{Annual}} \times 100$$

[e] Reading recorded in Massachusetts portion of AQCR.

[f] Highest reading used to calculate reduction since 2nd highest was not available.

[g] Reading recorded in New York portion of AQCR.

[h] Reading recorded in New Jersey portion of AQCR.

[i] SAROAD data indicated the existence of four stations exceeding the standard more than once. However, data was only given for one station.

TABLE A-6

CONNECTICUT FUEL COMBUSTION SOURCE SUMMARY

AQCR Name	AQCR No.	No. of Power Plants	Other Fuel Combustion Point Sources[b] TSP	Other Fuel Combustion Point Sources[b] SO_2	No. of Area Sources[c]	AQCR Total Emissions (10^3 tons/year) Part.	AQCR Total Emissions (10^3 tons/year) SO_2	% Emissions from Conn. Fuel Combustion Sources (10^3 tons/year) Part.	% Emissions from Conn. Fuel Combustion Sources (10^3 tons/year) SO_2
Eastern Conn.	41	6[d]	1	5	4	6.9	31.2	59	98
Hartford-New Haven Springfield	42	10[e]	1	26	5	59.4 (Conn. 23.8)[f]	191.5 (Conn. 93.0)[f]	24 (59)[g]	46 (96)[g]
N.J. - N.Y. - Conn.	43	4	0	5	2	228.4 (Conn. 12.2)[f]	641.2 (Conn. 57.9)[f]	4 (82)[g]	9 (97)[g]
Northwest Conn.	44	2	0	1	3	1.2	3.2	75	93

a - Connecticut Power Plants.

b - All data for significant sources in Connecticut only. Significant sources are those non-power plant sources whose total plant emissions are greater than 100 tons per year of the pollutant in question.

c - Conn. counties.

d - In addition to these six power plants indicated by NEDS, there is also another plant (Norwich Department of Public Utilities) indicated by Steam Electric Plant Factors and a nuclear plant (Millstone Point Co.). The Norwich plant is not included in emission totals.

e - In addition to these ten power plants indicated by NEDS there is also another plant (Wallington Dept. of Public Utilities) indicated by Steam Electric Plant Factors and a nuclear plant (Conn. Yankee Atomic Power). The Wallington plant is not included in emission totals.

f - Conn. emissions.

g - Percentage of Conn. emissions.

TABLE A-7

CONNECTICUT PARTICULATE EMISSIONS SUMMARY[a]

AQCR	Total (10^3 tons/yr)	%[c]	Electricity Generation (10^3 tons/yr)[d]	%	Point Source Fuel Combustion[b] (10^3 tons/yr)	%	Area Source Fuel Combustion (10^3 tons/yr)	%
Eastern Conn. (41)	6.9	2	1.5	22	0.5	7	2.1	30
Hartford-New Haven-Springfield (42)								
Conn. Portion	23.8	8	1.5	6	2.8	12	9.8	41
Mass. Portion	35.6	12	12.6	35	5.6	16	3.7	10
Total	59.4	20	14.1	24	8.4	14	13.5	23
New Jersey-New York-Conn. (43)								
Conn. Portion	12.2	4	5.2	43	0.2	2	4.6	38
N.J., N.Y. Portion	216.2	73	8.2	4	9.0	4	55.6	26
Total	228.4	77	13.4	6	9.2	4	60.2	27
Northwestern Conn. (44)	1.2	1	0 04	3	0.07	6	0.8	67
Total	295.9	100	29.0	10	18.2	6	76.6	26
Conn. Total	44.1	100	8.2	19	3.6	8	17.3	39

[a]Source: 1972 National Emissions Report, EPA, June 1974.

[b]Excludes emissions from electricity generation.

[c]Percent of total for all AQCR's.

[d]NEDS data; year of record 1971. NEDS data summary includes emissions from industrial power generation under the heading "Electric Generation". The values in this Table are for power plants operated by electric utility companies only.

TABLE A-8

CONNECTICUT SULFUR DIOXIDE EMISSIONS SUMMARY[a]

AQCR	Total (10^3 tons/yr)	%[c]	Electricity Generation (10^3 tons/yr)[d]	%	Point Source Fuel Combustion[b] (10^3 tons/yr)	%	Area Source Fuel Combustion (10^3 tons/yr)	%
Eastern Conn. (41)	31.2	4	18.9	61	4.4	14	7.2	23
Hartford-New Haven-Springfield (42)								
Conn. Portion	93.0	11	31.2	34	24.9	27	32.6	35
Mass. Portion	98.5	11	46.8	48	19.0	19	31.5	32
Total	191.5	22	78.0	41	43.9	23	64.1	33
New Jersey-New York-Conn. (43)								
Conn. Portion	57.9	7	39.6	68	1.6	3	15.3	26
N.J., N.Y. Portion	583.3	67	154.7	27	44.6	8	310.5	53
Total	641.2	74	194.3	30	46.2	7	325.8	51
Northwestern Conn. (44)	3.2	0	0.03	1	0.3	10	2.7	84
Total	867.1	100	291.2	33	94.8	11	399.8	46
Conn. Total	185.3	100	89.7	48	31.2	17	57.8	31

[a]Source: 1972 National Emissions Report, EPA, June 1974.

[b]Excludes emissions from electricity generation.

[c]Percent of total for all AQCR's.

[d]NEDS data; year of record 1971. NEDS data summary includes emissions from industrial power generation under the heading "Electric Generation". The values in this Table are for power plants operated by electric utility companies only.

TABLE A-9

CONNECTICUT EMISSION REGULATIONS

Particulate Emissions		Sulfur Dioxide
Existing Sources	New Sources	All Sources (After April 1, 1973)
.20 lbs/10^6 BTU	.10 lbs/10^6 BTU	sulfur content of fuels limited to 0.5% by weight

APPENDIX B

REGIONAL AIR QUALITY ASSESSMENT

TABLE B-1

REGIONAL INDICATORS FOR REVISION OF TSP REGULATIONS

AQCR Name	AQCR No.	No. of Stations[a] Reporting	No. of Stations[a] Violating Standards	Expected Attainment Date	Any Proposed AQMA Designations?	Total Conn. Emissions (10^3 Tons/Year)	% Emission from Fuel Combustion	Tolerance for Conn. Emissions Increase (10^3 Tons/Year)
Eastern Conn.	41	6	1	6/75	No	6.9	59	- .345
Hartford-New Haven-Springfield	42	67	14[c]	5/75	Yes	23.8	59	-16.66
N. J. - N. Y. - Conn.	43	166	74[d]	5/75	Yes	12.2	82	- 8.78
Northwest Conn.	44	4	0	b	No	1.2	75	+ .348

[a] Total number of stations throughout AQCR.

[b] Air Quality levels presently below Secondary Standards.

[c] Two stations violating annual secondary standard, and 12 stations violating 24-Hr secondary standard.

[d] 18 stations violating annual secondary standard, and 56 stations violating 24-Hr standard.

TABLE B-2

REGIONAL INDICATORS FOR REVISION OF SO_2 REGULATIONS

AQCR Name	AQCR No.	No. of Stations Reporting	No. of Stations Violating Standards	Expected Attainment Date	Any Proposed AQMA Designations?	Total Conn. Emissions (10^3Tons/Year)	% Emission from Fuel Combustion	Tolerance for Conn. Emissions Increase (10^3Tons/Year)
Eastern Conn.	41	8	0	a	No	31.2	98	+ 280.80
Hartford-New Haven-Springfield	42	25	4[b]	6/75	Yes	93.0	96	- 58.59
N. J. - N. Y. - Conn.	43	47	13[c]	6/75	Yes	57.9	97	- 4.05
Northwest Conn.	44	3	0	a	No	3.2	93	+ 37.12

[a]Air Quality levels presently below standards.

[b]Stations violating 24-Hr primary standard.

[c]One station violating annual primary standard, 10 stations violating 24-Hr primary standard and 2 stations violating the 3-Hr secondary standard.

APPENDIX C

POWER PLANT ASSESSMENT

TABLE C-1

CONNECTICUT POWER PLANT SUMMARY[a]

AQCR Name	AQCR No.	Plant Ownership and Location	Fuel Type	Fuel Quantity[b]	Sulfur[c] Content	NEDS Emissions (T/yr) Part.	NEDS Emissions (T/yr) SO_2	Allowable Emissions (T/yr)[d] Part.	Allowable Emissions (T/yr)[d] SO_2
Eastern Connecticut	41	Connecticut Light and Power Montville	Coal Dist. Oil Resid. Oil Diesel[e]	37,900 730 218,860 406	2.60 0.20 0.99 0.20	1380	18,826	3394	8955
		Connecticut Light and Power New London	LPG	2,000	0	2	0	18	0
		Connecticut Light and Power Preston	Dist. Oil[f]	1,870	0.01	16	13	26	650
		Connecticut Light and Power Waterford	Resid. Oil	1,000	0.95	12	75	15	39
		Connecticut Light and Power Killingly	Dist. Oil[f] Nat. Gas[f]	96 6	0.02 0	1	1	2	25
		Connecticut Light and Power Putnam	Dist. Oil[f]	2,310	0.02	19	16	32	400
Hartford-New Haven-Springfield	42	Connecticut Light and Power Berlin	LPG	1,970	0	2	0	18	0
		Connecticut Light and Power	Dist. Oil[f]	1,900	0.01	16	13	27	650

TABLE C-1
(cont.)

AQCR Name	AQCR No.	Plant Ownership and Location	Fuel Type	Fuel Quantity[b]	Sulfur[c] Content	NEDS Emissions (T/yr) Part.	NEDS Emissions (T/yr) SO_2	Allowable Emissions (T/yr)[d] Part.	Allowable Emissions (T/yr)[d] SO_2
Hartford-New Haven-Springfield	42	Connecticut Light and Power Thompsonville	Dist. Oil	209	0.02	3	1	7	25
			Nat. Gas	9	0				
			Dist. Oil[f]	159	0.02				
			Nat. Gas[f]	8	0				
		Hartford Electric Co. Hartford	Resid. Oil	84,570	0.99	488	6758	1627	12,273
			Dist. Oil[f]	25,536	0.01				
		Hartford Electric Co. Middletown	Resid. Oil	175,900	0.98	486	13537	2652	6,903
			Dist. Oil[f]	970	0				
		Connecticut Light and Power Branford	Dist. Oil[f]	1,990	0.01	17	14	28	700
		United Illuminating Co. Derby	Resid. Oil	3,091	0.99	14	238	46	120
		Connecticut Light and Power Devon	Coal	3,920	2.70	332	6311	1241	3,238
			Dist. Oil	112	0.20				
			Resid. Oil	80,930	0.96				
			Dist. Oil[f]	1,060	0.20				
		United Illuminating Co.	Resid. Oil	55,780	0.99	161	4335	837	2,189

TABLE C-1
(cont.)

AQCR Name	AQCR No.	Plant Ownership and Location	Fuel Type	Fuel Quantity[b]	Sulfur[c] Content	NEDS Emissions (T/yr) Part.	NEDS Emissions (T/yr) SO_2	Allowable Emissions (T/yr)[d] Part.	Allowable Emissions (T/yr)[d] SO_2
Hartford-New Haven-Springfield	42	Connecticut Light and Power Waterbury	Resid. Oil Nat. Gas	120 2,142	0.99 0	17	9	22	5
New Jersey-New York-Connecticut	43	United Illuminating Co. Bridgeport	Resid. Oil Dist. Oil[f]	276,600 1,120	0.56 0.06	355	12,178	4165	10,933
		United Illuminating Co. Bridgeport	Resid. Oil	70,940	0.60	190	3,343	1064	2,786
		Connecticut Light and Power Greenwich	Dist. Oil[f]	5,400	0.01	45	38	86	1,900
		Connecticut Light and Power Norwalk	Coal Resid. Oil Dist. Oil Diesel[e]	382,000 66,600 1,140 999	2.60 0.99 0.20 0.20	4606	24,009	1985	6,305
Northwestern Connecticut	44	Hartford Electric Co. Torrington	Dist. Oil[f]	2,250	0.01	19	16	32	800
		Hartford Electric Co.	Dist. Oil[f]	2,010	0.01	17	14	28	700

a - NEDS data; year of record 1971.

b - Solid fuel in tons, liquid fuel 10^3 gallons, gas 10^6 cuboc feet. All annual rates.

c - Percent sulfur by weight.

d - Calculated by applying existing regulations to NEDS emission and fuel use data.

e - Reciprocating engine.

f - Gas turbine.

TABLE C-2

CONNECTICUT POWER PLANT SUMMARY

AQCR Name	AQCR No.	No. of Plants[a]	Fuel Type	Fuel Quantity[b]	NEDS Emissions (Tons/yr)[c] Part.	NEDS Emissions (Tons/yr)[c] SO_2	Reduction Under Existing Regulations (Tons/yr)[d] Part.	Reduction Under Existing Regulations (Tons/yr)[d] SO_2
Eastern Connecticut	41	6	Coal	37,900	1430	18,931	-2057	8862
			Resid. Oil	219,860				
			Dist. Oil	5,006				
			Nat. Gas	6				
			Diesel	406				
			LPG	2,000				
Hartford-New Haven-Springfield	42	10	Coal	3,920	1536	31,216	-4969	5113
			Resid. Oil	400,391				
			Dist. Oil	31,936				
			Nat. Gas	2,159				
			LPG	1,970				
New Jersey-New York-Connecticut	43	4	Coal	382,000	5196	39,568	-2104	17644
			Resid. Oil	414,140				
			Dist. Oil	7,660				
			Diesel	999				
Northwestern Connecticut	44	2	Dist. Oil	4,260	36	30	- 24	-1470

a - Connecticut plants only. See Table C-1 for data on individual plants

b - Solid fuel in tons, liquid fuel 10^3 gallons, gas 10^6 cubic feet. All annual use.

c - NEDS data; year of record 1971. NEDS data summary includes emissions from industrial power generation under the heading "Electric Generation". The values in this Table are for power plants operated by electric utility companies only.

d - Existing regulations applied against NEDS emissions and Fuel data. Negative values indicate NEDS emissions are currently below allowable emissions.

TABLE C-3

1975 POWER PLANT FUEL USE SUMMARY

Air Quality Control Region	Plant Name	1975 Capacity (MW)	1975 Fuel Use Type	%S	Quality[a]	1974 %S[b]	%S by Regulation
Eastern Conn. (41)	Connecticut Light & Power Co. (Mentville)	557	Coal	2.8	12	2.44	.5
			Oil	.55	234,611(F)		.5
	Norwich Dept. of Public Utilities (Norwich)	143	Oil	NA	1344(S)	NA	.5
Hartford-New Haven - Springfield (42)	Conn. Light & Power Co. (Devon)	454	Oil	.53	189,546(F)	1.13	.5
	Hartford Electric Co. (Middletown)	797.39	Coal	2.2	41	2.07	.5
			Oil	.55	260,861(F)	1.10	.5
	Hartford Electric Co. (Hartford)	216.75	Oil	.50	71,862(F)	.50	.5
	United Illuminating Co. (Derby)	20.0	Oil	NA	2730(S)	NA	.5
	Wallington Dept. of Public Utilities (Wallingford)	22.5	Coal	NA	9(S)	NA	.5
	United Illuminating Co. (New Haven)	445[c]	Oil	NA	252,167[d]	NA	.5
	United Illuminating Co. (New Haven)	146.29	Oil	.46	42,042(F)	.46	.5

TABLE C-3 (Cont.)

1975 POWER PLANT FUEL USE SUMMARY

Air Quality Control Region	Plant Name	1975 Capacity (MW)	1975 Fuel Use Type	1975 Fuel Use %S	Quality[a]	1974 %S[b]	%S by Regulation
N.J.-N.Y. - Conn. (43)	Conn. Light & Power Co. (Norwalk)	326.39	Oil	.56	148,218(F)	1.15	.5
	United Illuminating Co. (Bridgeport)	660.50	Oil	.39	260,609(F)	.40	.5
	United Illumingating Co. (Bridgeport)	155.50	Oil	.40	41,874(F)	.40	.5

[a] Coal - 10^3 tons/year, Oil - 10^3 gal/year, Gas - 10^6 cu.ft./year. Estimates are from FPC (F), the NEDS (N) files of June 1974, or Steam Electric Plant Factors (S), 1973 Edition, National Coal Association, Washington, D.C. 1975 fuel use was assumed the same as 1973 unless there was a change in generating capacity.

[b] In some cases fuel sulfur contents have changed between 1973 and 1974 though complete fuel use was not available for 1974.

[c] Operative in 1975.

[d] Fuel use calculated from generating capacity using 8.5×10^{10} BTU/yr input per megawatt (assumes 35% overall plant energy conversion efficiency) and 150×10^3 BTU per gallon of oil.

APPENDIX D

INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SOURCE ASSESSMENT

TABLE D-1

CONNECTICUT SIGNIFICANT[a] SOURCES, PARTICULATE

AQCR Name	AQCR No.	Plant Name	Fuel Type	Fuel Quantity[b]	Sulfur Content[c]	Emissions (T/yr) NEDS[d]	Emissions (T/yr) Allowable[e]
Eastern Connecticut	41	Pfizer Inc.	Resid. Oil	39,850	0.96	246	598
Hartford-New Haven-Springfield	42	Uniroyal	Resid. Oil	10,709	0.98	124	161

a - All data for significant sources in Connecticut only. Significant sources are those non-power plant sources whose total plant fuel combustion emissions are greater than 100 tons per year of the pollutant in question.

b - Liquid fuel in 10^3 gallons, gas 10^6 cubic feet. All annual rates.

c - Percent sulfur by weight.

d - NEDS data; year of record 1971.

e - Calculated by applying existing regulations to NEDS emission and fuel use data.

TABLE D-2

CONNECTICUT SIGNIFICANT[a] SOURCES, SO_2

AQCR Name	AQCR No.	Plant Name	Fuel Type	Fuel[b] Quantity	Sulfur[c] Content	Emissions (T/yr) NEDS	Emissions (T/yr) Allowable[e]
Eastern Connecticut	41	Pfizer Inc.	Resid. Oil	39,850	0.96	3004	1565
		Federal Paper Board Co.	Resid. Oil	13,500	0.50	528	528
		American Thread Co.	Resid. Oil	4,740	0.95	351	185
		General Dynamics	Resid. Oil Resid. Oil	1.650 2,025	0.47 0.48	139	146
		Rogers Corp.	Resid. Oil	1.750	0.87	120	69
Hartford-New Haven-Springfield	42	Uniroyal	Resid. Oil	10,709	0.98	823	420
		Olin Corp.	Resid. Oil	8,940	0.94	660	351
		United Aircraft Corp.	Dist. Oil	8,563	0.85	523	308
		United Aircraft Corp.	Resid. Oil Resid. Oil Nat. Gas	6,828 139 635	0.80 1.30 0	444	273
		Yale University	Resid. Oil	5,280	0.98	408	208
		Yale University	Resid. Oil	5,220	0.95	391	206
		Chase Brass & Copper	Resid. Oil	5,640	0.85	376	221

TABLE D-2
(cont.)

AQCR Name	AQCR No.	Plant Name	Fuel Type	Fuel[b] Quantity	Sulfur[c] Content	Emissions (T/yr) NEDS	Emissions (T/yr) Allowable[e]
Hartford-New Haven-Springfield	42	United Aircraft Corp.	Resid. Oil	5,320	0.81	338	209
		Combustion Engineering	Resid. Oil	8,091	0.47	297	316
		Dexter Corp.	Resid. Oil Nat. Gas	7,000 54	0.50 0	274	274
		United Aircraft Corp.	Resid. Oil	3,425	1.00	270	135
		A. N. Pierson Inc.	Resid. Oil	2,880	0.98	222	113
		United Aircraft Corp.	Resid. Oil LPG	5,750 17	0.48 0	216	225
		Pratt Whitney Mach. Tool	Resid. Oil	2,716	1.00	212	106
		Uniroyal	Resid. Oil	2,598	0.98	200	102
		Hartford Hospital	Resid. Oil	2,340	0.98	180	92
		Uniroyal	Resid. Oil	2,400	0.95	178	94
		Pond Lily Co.	Resid. Oil	2,179	0.95	162	85
		Armstrong Rubber Co.	Resid. Oil Nat. Gas	3,990 33	0.47 0	147	156

TABLE D-2
(cont.)

AQCR Name	AQCR No.	Plant Name	Fuel Type	Fuel[b] Quantity	Sulfur[c] Content	Emissions (T/yr) NEDS[d]	Emissions (T/yr) Allowable[e]
Hartford-New Haven-Springfield	42	Dart Ind.	Resid. Oil	1,780	1.00	140	70
		Amerbelle Corp.	Resid. Oil	1,760	1.00	138	69
		Lydall Inc.	Resid. Oil	1,700	0.97	130	67
		Yale University	Resid. Oil	1,736	0.95	130	68
		G. Fox Co.	Resid. Oil	1,500	0.98	115	59
		Bemis Co.	Resid. Oil Resid. Oil	1,295 150	1.00 0.50	109	58
		Tad Jones	Resid. Oil	2,600	0.50	102	102
New Jersey-New York-Connecticut	43	General Electric	Resid. Oil	8,010	1.00	627	314
		United Aircraft Corp.	Resid. Oil	2,540	0.90	179	99
		Industrial Development Fund	Resid. Oil	2,270	1.00	178	89
		American Cyanamid	Resid. Oil Nat. Gas	1,770 100	1.00 0	139	70
		Carpenter Technology Corp.	Resid. Oil	3,164	0.50	124	124

TABLE D-3

CONNECTICUT SIGNIFICANT[a] SOURCE SUMMARY

AQCR Name	AQCR No.	Fuel Type	Fuel[b] Quantity	NEDS Emissions (Tons/yr)[c] Part.	NEDS Emissions (Tons/yr)[c] SO_2	Reduction Under Existing Regulations (Tons/yr)[d] Part.	Reduction Under Existing Regulations (Tons/yr)[d] SO_2
Eastern Connecticut	41	Resid. Oil	63,515	246	4142	-352	1649
Hartford-New Haven-Springfield	42	Resid. Oil Dist. Oil Nat. Gas LPG	103,966 8,563 722 17	124	7185	- 37	2798
New Jersey-New York-Connecticut	43	Resid. Oil	17,754	0	1247	0	551
Northwestern Connecticut	44	Resid. Oil	5,310	0	208	0	0

a - All data for significant sources in Connecticut only. Significant sources are those non-power-plant sources whose total plant emissions are greater than 100 tons per per year of the pollutant in question. Sources are listed in Tables D-1 and D-2.

b - Liquid fuel in 10^3 gallons, gas in 10^6 cubic feet. All annual rates.

c - NEDS data year of record 1971. Emissions listed are those from sources which are significant emitters of the indicated pollutant, i.e. particulate emission values do not include particulate emissions from significant SO_2 sources unless a source is a significant source of both pollutants.

d - Existing regulations applied against NEDS emissions and fuel data.

APPENDIX E

AREA SOURCE ASSESSMENT

TABLE E-1

CONNECTICUT AREA SOURCES[a]

AQCR Name	AQCR No.	Fuel Burned			Emissions[a]	
		Type	Amount[b]	%S	TSP	SO_2
Eastern Conn.	41	Coal:				
		Anthracite	1,530	.7	14	35
		Bituminous	5,630	2.4	676	593
		Oil:				
		Distillate	125,270	.2	701	2,674
		Residual	35,580	.6	563	3,849
		Gas:				
		Natural	6,450	-	58	2
		Process	-	-	-	-
		Wood:	4,200	-	52	1
Hartford-New Haven - Springfield	42	Coal:				
		Anthracite	4,560	.7	41	104
		Bituminous	32,150	2.4	3,862	3,386
		Oil:				
		Distillate	464,290	.2	2,756	10,433
		Residual	211,700	.6	2,730	18,634
		Gas:				
		Natural	38,640	-	361	12
		Process	-	-	-	-
		Wood:	2,400	-	30	1

TABLE E-1 (Cont.)

CONNECTICUT AREA SOURCES[a]

AQCR Name	AQCR No.	Fuel Burned			Emissions[a]	
		Type	Amount[b]	%S	TSP	SO_2
New Jersey-New York - Connecticut	43	Coal:				
		Anthracite	2,560	.7	23	58
		Bituminous	14,950	2.4	1,796	1,575
		Oil:				
		Distillate	233,180	.2	1,304	4,933
		Residual	106,280	.6	1,277	8,723
		Gas:				
		Natural	18,840	-	172	5
		Process	-	-	-	-
		Wood:	900	-	1	0
Northwestern Conn.	44	Coal:				
		Anthracite	1,220	.7	11	28
		Bituminous	2,300	2.4	277	243
		Oil:				
		Distillate	52,450	.2	251	963
		Residual	17,150	.6	212	1,447
		Gas:				
		Natural	2,660	-	24	0
		Process	-	-	-	-
		Wood:	1,300	-	16	0

a NEDS data
b Coal in tons; Oil in 10^3 gals; Gas in MCF; Wood in tons.
c Emissions in tons/year.

APPENDIX F

FUEL USE SUMMARY

TABLE F-1

CONNECTICUT FUEL USE SUMMARY[a]

Air Quality Control Region	Coal (10^3 tons) Anthracite	Coal (10^3 tons) Bituminous	Oil (10^3 Gals) Residual	Oil (10^3 Gals) Distillate	Gas (10^6 cu.ft.) Natural	Gas (10^6 cu.ft.) Process
Eastern Connecticut Intrastate (41)						
Area Sources	1.53	5.63	35,580	125,270	6350	
Point Sources		37.9	286,891	5,011	6	
Total	1.53	43.53	322,471	130,281	6356	
Hartford-New Haven Springfield Interstate[b] (42)						
Area Sources	12.44	35.74	345,950	745,680	54,960	
Point Sources	226.06	933.94	737,573	42,424	5,355	
Total	238.50	977.16	1083,523	788,104	60,315	
New Jersey-New York Connecticut Interstate[b] (43)						
Area Sources	426.86	57.97	3405,720	4524,760	479,220	
Point Sources	167.33	3209.93	5214,636	535,764	145,407	
Total	549.19	3267.90	8620,356	5060,524	624,627	
Northwestern Connecticut Intrastate (44)						
Area Sources	1.22	2.30	17,150	52,450	2,660	
Point Sources			6,387	4,259	92	
Total	1.22	2.30	23,537	56,709	2,752	
Connecticut[c]						
Area Sources	9.87	55.03	370,710	875,190	67,180	
Point Sources	226.06	419.30	1328,513	60,431	4,650	
Total	353.93	474.34	1699,223	935,621	71,830	

a NEDS "Stationary Source Fuel Summary Report"
b Entire AQCR not just Conn. portion
c Connecticut fuel use includes only the Conn. portion of the two interstate AQCR's (42, 43)